OPINIONS AND DECLARATIONS RENDERED BY THE INTER-NATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Edited by

FRANCIS HEMMING, C.M.G., C.B.E. Secretary to the Commission

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OPINION 235

Designation, under the Plenary Powers, of a lectotype for the nominal species Ammonites cordatus Sowerby (J.), 1813 (Class Cephalopoda, Order Ammonoidea)



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INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

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Fig. 1.



Fig. 2.

Facsimile reproductions of the figures given by Sowerby (J.), 1813, Min. Conch. Great Brit. 1: plate 17 of the two syntypes of Ammonites cordatus Sowerby, 1813.

- FIG. 1.—Facsimile of fig. 2 on Sowerby's plate 17 (= the specimen selected as the holotype of *Ammonites cordatus* Sowerby, 1813, by Miss M. Healey in 1905).
- FIG. 2.—Facsimile of fig. 4 on Sowerby's plate 17 (= the specimen which in *Opinion* 235 the International Commission on Zoological Nomenclature designated under its Plenary Powers to be the holotype of *Ammonites cordatus* Sowerby, 1813).

OPINION 235

DESIGNATION, UNDER THE PLENARY POWERS, OF A LECTOTYPE FOR THE NOMINAL SPECIES "AMMONITES CORDATUS" SOWERBY (J.), 1813 (CLASS CEPHALOPODA, ORDER AMMONOIDEA)

RULING:—(1) Under the Plenary Powers, all selections of a lectotype for the nominal species Ammonites cordatus Sowerby (J.), 1813 (Class Cephalopoda, Order Ammonoidea) made prior to the present Ruling are hereby set aside, and the specimen illustrated as figure 4 on plate 17 of volume 1 of Sowerby (J.), Mineral Conchology of Great Britain, published in 1813, is hereby designated as the lectotype of the foregoing species.

(2) The specific name cordatus Sowerby (J.), 1813, as published in the combination Ammonites cordatus and as determined in (1) above, is hereby placed on the Official List of Specific Names in Zoology as Name No. 54.

L—THE STATEMENT OF THE CASE

On 13th August 1936 Dr. W. J. Arkell, M.A., D.Sc., F.R.S. (then of the *University Museum*, *Oxford*, and now of the *Sedgwick Museum*, *Cambridge University*, *Cambridge*) addressed a letter to the then Secretary to the International Commission (Dr. C. W. Stiles), drawing attention to a paper which he had recently published (1936, *Quart. J. geol. Soc. Lond.* 92: 152) on the question of the specimen to be accepted as the lectotype

of the nominal species Ammonites cordatus Sowerby (J.), 1813 (Class Cephalopoda, Order Ammonoidea) and asking the Commission either to rule as invalid, or to suppress under its Plenary Powers, the lectotype selection made for this species by Miss M. Healey (1905) and itself to designate as the lectotype the other specimen figured by Sowerby in 1813 (i.e. the specimen illustrated as figure 4 on plate 17 of volume 1 of the Mineral Conchology of Great Britain.) For the reasons explained in paragraphs 4 and 5 below, it was not until 1943 that effective progress was made in the consideration of this application. Dr. Arkell's application, as then revised by him, was as follows:—

On the holotype of "Ammonites cordatus" Sowerby, 1813 (Class Cephalopoda, Order Ammonoidea)

By W. J. ARKELL, D.Sc. (University Museum, Oxford)

Plate 1.

Great confusion arises from the inconsistency with which different authors adopt index fossils for zones in the Jurassic. Each zone has several current indices. In consequence the present applicant has been endeavouring to stabilise usage by advocating, and himself following, a rule of priority in zonal nomenclature on the lines of that accepted in zoological nomenclature. He does not advocate rigid adherence to priority when fresh confusion would be involved, but merely the choice, for any particular zone, of the oldest established zonal index, provided that it is appropriate. It seems that, if this procedure does not come to be adopted, there will be no end to the number of times a zone will be renamed by new authors, unaware of existing names or ignorant of their appropriateness, or dissatisfied with them for some local reason.

An application of this principle to the English Corallian Beds or Upper Oxfordian, in conjunction with a detailed study of the stratigraphy in the type locality, has been published by the present author (Arkell, 1936). A speaker in the discussion (: 187) of this paper remarked that the author "had restored the Corallian almost to its original simplicity, and had given good reasons for doing so".

A similar treatment of the Oxford Clay (Lower Oxfordian and Upper Callovian Stages) has also been published (Arkell, 1939). There has been great confusion in the zonal nomenclature of these formations in recent years, especially during the inter-war period.

While the present paper has been in the press, the whole question of a code of rules for stratigraphical nomenclature has been taken in another place (Arkell, 1945). The subordination of stratigraphical nomenclature to zoological nomenclature makes such cases as this important, for a purely technical point in the International Code of Zoological Nomenclature concerning an index fossil of a zone can cause great confusion in stratigraphy.

The first author to introduce the word "zone" into geology was Alcide d'Orbigny, and at the same time he outlined a scheme of zones with indices, many of which have been used ever since (d'Orbigny, 1852). It seems highly desirable to standardise usage by adopting these zonal indices wherever practicable. One of d'Orbigny's indices proposed in the work referred to above was that of Ammonites cordatus Sowerby (J.), 1813, Min. Conch. Great Brit. 1:51. That name has been in continuous use as zonal index, for all, or a restricted part of, the zone for which it was originally proposed, down to the present day.

I append the following summary of the history of the zone of *Cardioceras cordatum* (Sowerby, 1813) (=*Anumonites cordatus* Sowerby, 1813).

D'Orbigny (1852) was soon followed by Hébert (1857, 1860), who adopted the zone for the whole of the Paris Basin. Tombeck (1874), who was also one of the earlier writers to deal with Upper Jurassic zones, adopted the "Cordatus Zone" for the department of the Haute-Marne, using the term in its modern sense. Oppel, often (erroneously) claimed as the founder of the zonal idea, but certainly the greatest and most accurate of its early exponents, at first did not distinguish between the "Lamberti" and "Cordatus" zones, for in south-west Germany, where he principally worked, these zones are condensed and the fossils mixed. In his last work, however, Oppel (1866) took over these zones from his French colleagues. They had already been adopted for North Germany by Credner (1863), and the succession had not since been questioned.

H. Douvillé (1881), by his study of the Upper Jurassic on the north side of the Paris Basin and in the Normandy cliffs in particular, gave greater precision to the zonal sequence by establishing a "Mariae Zone" between the "Cordatus" and "Lamberti" zones. These three zones—Lamberti, Mariae and Cordatus—are the appropriate zones for the English Upper Oxford Clay also, and after a revision of English collections and a study of all the relevant English exposures and of the Norman collections in Paris and Caen, I have adopted these three zones with the three zonal indices established by H. Douvillé in 1881, both in the papers referred to above and in my monograph on the Ammonites of the English Corallian Beds, now in course of publication by the Palaeontological Society.

The arrangement proposed by H. Douvillé was followed by all subsequent French writers on the subject, of whom the most modern was his son R. Douvillé, who wrote a series of monographs on the fossils from these zones (1912, 1914, 1915), and Raspail (1901), who published the most detailed and authoritative stratigraphical account of the classic sections on the coast of Normandy.

Thus up to 1915, all French writers on the subject used a "Cordatus Zone", and its meaning was unambiguous and had never been questioned. It was the "Oolithe ferrugineuse" of the Normandy coast and of Neuvizy in the Ardennes—to cite two of the best known and most highly fossiliferous localities.

To trace the history of the zone all over Europe would take too much space, but that the "Cordatus Zone" was used everywhere is shown by numerous works, of which perhaps the most important is Lahusen's monograph (1883) on the Ryasan fauna of Russia. Haug's great Traité (1908—1911) standardised the "Cordatus Zone", among other "zones classiques" for all Europe.

In England work comparable with that cited for France and certain other countries is only now being done. No monographs have been published on ammonites or faunas from the Oxfordian, except those recently completed, or now in progress, by the present writer. The "Cordatus Zone" was, however, used officially for the Upper Oxford Clay by the Geological Survey at least since 1895 (see Woodward (H. B.), 1895).

The Ammonites cordatus referred to as the characteristic fossil of the "Cordatus Zone" was not always the same species. D'Orbigny himself figured three different species under this name, and many geologists took d'Orbigny's figures as the standard rather than Sowerby's. But this is unimportant, in view of the fact that they are all contemporary species.

In his original description of *Ammonites cordatus*, Sowerby (1813) figured two specimens which he referred to this species. Those specimens were represented in figures 2 and 4 of Sowerby's plate 17. These figures are reproduced in facsimile on plate 1 in the present paper.

Both Sowerby's specimens are preserved in the British Museum. The specimen represented in Sowerby's figure 2 is a nucleus only 20 mm. in diameter and not definitely identifiable; the specimen represented in Sowerby's figure 4, although also wholly septate (i.e. lacking the body-chamber) is easily identifiable and is well representative of a whole fauna of Cardiocerates characteristic of the top of the Oxford clay and the Wiltshire Lower Calcareous Grit (the "Cordatus Zone").

Unfortunately Miss M. Healey (1905), in a short note, chose the smaller figure (i.e. Sowerby's fig. 2) to be the "holotype" of Ammonites cordatus Sowerby. She pointed out that the smaller specimen did not come from the Oxford Clay but from the "Lower (?) Corallian". As I have shown (Arkell, 1936), its true horizon is the Upper Corallian, namely the "Plicatilis Zone".

Hence, if Miss Healey's type designation must be accepted, the name *Anumonites cordatus* Sowerby, 1813, must be used for an ammonite of the "*Plicatilis* Zone" or Upper Corallian, a species not known from the Oxford Clay, of which the original "*Cordatus* Zone" was part; and the "*Cordatus* Zone" of the literature of the last 80 years will have to be renamed.

Miss Healey's procedure, as is apparent from the references cited above, has been ignored by nearly all geologists and palaeontologists. In 1913, however, A. P. Pavlow, in a description (in Russian) of some fossils from northern Siberia collected on Baron Toll's polar expedition, gave the new name Cardioceras subcordatum Pavlow, 1913, Mém. Acad. Sci. St. Pétersb. (8) 21 (4): 48, to the species figured by Sowerby as fig. 4 on his pl. 17. Seven years later S. S. Buckman, 1920, Type Ammonites: 15, not knowing of Pavlow's action, gave the name Cardioceras cardia nom. nov. to the same species. Buckman's trivial name "cardia" has been adopted for the "Cordatus Zone" by Dr. L. F. Spath, who advocates rejecting the name "cordatus" on the grounds of technical ineligibility in view of Miss Healey's type designation (Spath, 1943). Dr. Spath, however, rejected Pavlow's name "subcordatum" on the ground that its use might be "misleading". As I have pointed out, however, (Arkell, 1941), Cardioceras subcordatum Pavlow, 1913, is technically the correct name for the species figured by Sowerby under the name Ammonites cordatus in fig. 4 of his pl. 17 (if Sowerby's fig. 2 of pl. 17 is to be taken as the type of Ammonites cordatus Sowerby), notwithstanding the existence of the species Ammonites subcordatus d'Orbigny, 1945, in Murchison, Geol. Russia 2:434, pl. 24, figs. 6, 7. This latter species is a Kimeridgian species of the genus *Amoeboceras* Hyatt, 1900, in Eastman-Zittel, *Text-Book* Palaeont. 1:580, and does not belong to, and was not first described in, the same genus as Cardioceras subcordatum Pavlow, 1913.

The following points should be noted:-

⁽¹⁾ Miss Healey's procedure, setting aside the "obvious" type specimen in favour of another, too small and badly preserved to be interpreted with certainty, runs counter to Recommendation "n" set out in Part III of Article 30 of the Rules.

⁽²⁾ Miss Healey did no systematic work on ammonites. She merely refigured a few isolated type-specimens for *Palaeontologia Universalis*. Her work therefore does not carry the authority of a revision.

⁽³⁾ Miss Healey's choice of figure 2 as the type of Ammonites cordatus Sowerby reversed the decision implicit in the works of the leading Jurassic stratigraphers

and palaeontologists of several generations and countries, including d'Orbigny, Credner, Oppel, Hébert, Tombeck, H. B. Woodward, H. & R. Douvillé, Haug, Raspail, Lahusen, and de Grossouvre.

- (4) Since the first submission of the present application to the International Commission, Sowerby's fig. 4 has again been quoted as the genotype of Cardioceras Neumayr & Uhlig, 1881, Palaeontogr. 27: 140 (under the trivial name cordatum Sowerby) by Professor F. Roman (1938) in his monumental Ammonites jurassiques et crétacés (: 228), which will be a standard work of reference for generations to come.
- (5) The fact that the technically correct prior substitute name for Sowerby's fig. 4 is Cardioceras subcordatum Pavlow, 1913, means that the name Cardioceras cardia Buckman, 1920, and the term "Cardia Zone" adopted by Buckman and Spath will in any case have to be changed again. Spath's course, to continue to use the synonym cardia rather than risk the confusion involved in the second change, is no solution.

In view of this history, I make formal application for the setting aside of Miss Healey's type selection, as the type of Ammonites cordatus Sowerby, 1813, of the species figured by Sowerby as fig. 2 on pl. 17, and for the stabilisation of Cardioceras cordatum (Sowerby, 1813) as index of the "Cordatus Zone", with Sowerby's fig. 4 (pl. 17) as type. Only so can confusion and unnecessary changes in stratigraphical nomenclature be avoided, and a historical name be usefully retained.

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II.—THE SUBSEQUENT HISTORY OF THE CASE

- 2. The documents relating to the present case were transferred in January 1938 to the care of Mr. Francis Hemming, who in 1936 had been elected Secretary to the International Commission on the retirement of Dr. Stiles. This case was thereupon given the Registered Number Z.N.(S.) 58.
- 3. On 16th February 1938, Dr. L. F. Spath (British Museum (Natural History), London) wrote to the Secretary objecting to the proposal made by Dr. Arkell in his paper of 1936 and expressing the view that, contrary to the opinion held by Dr. Arkell, the reversal of Miss Healey's lectotype selection for Ammonites cordatus Sowerby "now after all these years would cause great confusion". Dr. Spath's view was at once communicated to Dr. Arkell, who however remained of his previous opinion, and on 2nd May 1938 submitted to the International Commission a formal application in the sense indicated in his original letter of 13th August 1936.
- 4. It had not been found possible to advance the consideration of the present case by the time that the outbreak of war in Europe in September 1939 led to the evacuation of the records of the International Commission from London to the country as a

precaution against the risk of destruction through air raids. The Secretariat in London was re-opened in 1942, and steps were immediately taken to establish the *Bulletin of Zoological Nomenclature* as a means for bringing to the attention of zoologists applications submitted to the International Commission for decision. Work was at once started on outstanding applications with a view to arranging for their publication in the newly established *Bulletin*.

- 5. In September 1943 correspondence took place between the Secretary and Dr. Arkell who then slightly revised his application of 2nd May 1938.
- 6. Comment received from Dr. L. F. Spath (British Museum (Natural History), London): In September 1943 there was also a further exchange of letters in regard to this case between the Secretary and Dr. Spath (see paragraph 3 above), as the result of which, at Mr. Hemming's suggestion, Dr. Spath on 16th September 1943 furnished a statement of his views for the consideration of the International Commission. The statement so furnished by Dr. Spath was as follows:—

I am taking the view that the species Ammonites cordatus has never been anything but monotypic. As Healey (1905), Crick (1910), and others recognized, the original of Sowerby's fig. 2 has always been the holotype of Amm. cordatus and thus is not "subject to change". For according to Art. 30, ii e.g. the original of Sowerby's fig. 4, being only doubtfully referred to the species by its author, is excluded from consideration in determining the type.

With regard to any confusion that may arise, it seems to me that a number of ammonite species have been or are being loosely or wrongly used by certain stratigraphers (in the opinion of their rivals) so that zonal nomenclature is constantly being changed and rectified. But the fact that the name *cordatus* zone is wrongly used in stratigraphy (which I deny) has nothing to do with the status of the species *Ammonites cordatus* and is irrelevant from the point of view of zoological nomenclature.

7. In the summer of 1944, Mr. Hemming, as Secretary to the Commission, prepared, in consultation with Dr. Karl Jordan (British Museum (Natural History), Zoological Museum, Tring, Herts, England), at that time President of the Commission, the

following note on the scope of the proposal submitted by Dr. Arkell:—

On the scope of the proposal submitted to the International Commission by Dr. W. J. Arkell in relation to the name "Ammonites cordatus" Sowerby, 1813 (Class Cephalopoda, Order Ammonoidea)

By FRANCIS HEMMING, C.M.G., C.B.E.

(Secretary to the International Commission on Zoological Nomenclature.)

The proposal now before the International Commission in relation to the name *Ammonites cordatus* Sowerby, 1813, is:—

- (1) that the International Commission should:—
 - (a) suppress the designation by Miss Healey (1905) of the species figured by Sowerby (1813) as fig. 2 on pl. 17 as the type of *Anumonites cordatus* Sowerby, 1813; and should
 - (b) designate as the type of the above species the species figured by Sowerby (1813) as fig. 4 on pl. 17;
- (2) that the International Commission should stabilise *Cardioceras* cordaium (Sowerby, 1813) as index of the stratigraphical zone known as the "Cordatus Zone", with Sowerby's fig. 4 as type.

Of the above proposals, proposal (1) would be within the power of the International Commission to grant if they were satisfied that the strict application of the Rules as applied to this case would clearly result in greater confusion than uniformity; for in that case the International Commission would be enabled to use the Plenary Powers granted them by the Ninth International Congress of Zoology at Monaco in 1913 for the purpose of suspending the Rules as applied to this case.

The question whether proposal (1) is one which could properly be granted by the Commission depends, therefore, on whether the evidence so far brought forward, together with any additional evidence which may be brought forward during the consideration of this case, satisfies them that the strict application of the Rules as applied to the present case would clearly result in greater confusion than uniformity. No limitation is imposed on the Commission as to the type of confusion of which account may be taken by them when considering in any given case whether they should make use of their Plenary Powers. It is, therefore, open to the Commission in such a case to take account not only of confusion in the taxonomic field but also (for example) of confusion in stratigraphical or other technical literature and confusion in textbooks and other standard works used in the teaching of zoology at the universities and elsewhere.

Proposal (2) relates to an entirely different matter; it is concerned not with a question of zoological nomenclature but with a question of palaeontological terminology. As such, proposal (2) is concerned with a matter which falls outside the scope of the International Code of Zoological Nomenclature and is, therefore, a matter with which, under their existing powers, the International Commission is not authorised to deal. If the discussion arising from the initiative taken by Dr. Arkell in his recent paper on the "Standard of the European Jurassic" shows that there is a general desire on the part of palaeontologists that the nomenclature of stratigraphical zones should be brought under regulation, the International Commission will be glad to cooperate in the formulation of any such scheme, in so far as it raises, or impinges upon, questions relating to the nomenclature of the index fossils of such zones.

- 8. Dr. Arkell's application and Mr. Hemming's note were sent to the printer in October 1944, but, owing to difficulties arising from paper rationing, shortage of labour at the printing works and similar causes, publication did not actually take place until 26th June 1946 (Arkell, 1946, Bull. zool. Nomencl. 1: 181—184, 1 pl.; Hemming, 1946, ibid. 1: 185). The publication in the Bulletin of Dr. Arkell's application elicited the comment reproduced in the following paragraph from the Joint Committee on Zoological Nomenclature for Paleontology in America.
- 9. View of the Joint Committee on Zoological Nomenclature for Paleontology in America: The view of the Joint Committee on Zoological Nomenclature for Paleontology in America on this case was submitted in a letter dated 3rd November 1947 from Dr. J. Brookes Knight (Research Associate, United States National Museum, Washington, D.C., U.S.A.), who at that time was Chairman of the Joint Committee. The following is the text of that letter:—

On July 3, 1947 the Chairman of the Joint Committee on Zoological Nomenclature for Paleontology in America submitted to the membership of the Committee for consideration and approval the following resolution:—

RESOLVED: That the Joint Committee on Zoological Nomenclature of Paleontology in America support the end sought in the petition of Dr. J. W. Arkell that the designation by Healey of the specimen shown by Sowerby as fig. 2 on plate 17 as lectotype of Ammonites cordatus to be set aside under suspension of the Règles and that the specimen shown by Sowerby as fig. 4 on the same plate be fixed as lectotype in its stead. In supporting the end sought in Arkell's petition the Joint Committee expressly does not endorse the nomenclatural points presented by him, most of which it believes to be irrelevant if not disingenious. Likewise

¹ Arkell, 1946, Bull. Amer. geol. Soc. 57: 1-34.

it disapproves the establishment of any general principle that the use of a zoological name for a zone-fossil in stratigraphy necessarily requires the stabilization of that name contrary to the principles of zoological nomenclature or taxonomy.

The vote of the membership was 6 for approval of the resolution and 5 for disapproval, with Stenzel absent and not voting. Those in the affirmative were Romer, Newell, Cooper, Moore, Keen and Knight; in the negative were Simpson, Wells, Palmer, Frizzell and Reeside.

Comments were as follows:-

Romer—I agree with the resolution. But in my ignorance can the Commission fix the type specimen of a species?

Wells—Nay.

Simpson—As it stands, I vote "Nay" on this resolution. I would support it if it embodied a brief statement as to why the Committee thinks suspension is justified and omitted the last two sentences. It seems bad practice to vote in favor of an action and accompany this vote by arguments against the action. It also seems to me unnecessary to bait Arkell or others who may agree with him, and this is likely to lead to needless dissension that paleontologists can ill afford if we are to get anywhere with efforts to clean up nomenclature.

Keen—Yes, that is, I would support the recommendation he [Arkell] offers.

Frizzell—I vote nay. Although I am not particularly concerned with this case, it seems to me that a dangerous precedent would be inaugurated. Incidentally, what Arkell wanted to have designated is a lectotype. The Rules sanction only "type of a species" (insofar as I can discover). It is somewhat important to distinguish between a holotype and lectotype, since the latter never has the complete authenticity of the former.²

Reeside—No. Commission should not designate holotype specimens.

It is to be noted that Simpson's objection is to the form of the Joint Committee's resolution, not to its support of Arkell's petition. Simpson's objections were circulated to the entire Committee and brought no second. Hence the resolution was not amended and the vote stands as cast. The Chairman is responsible for the wording of the resolution and should say that the protest on irrelevant and disingenious legal argumentation was aimed not so much at Arkell as at the all too

The point here raised by Dr. Frizzell was dealt with by the Thirteenth International Congress of Zoology, Paris, 1948, when it explicitly recognised the concepts of "holotype" and "lectotype" and introduced definitions of those terms into the Règles (1950, Bull. zool. Nomencl. 4:185—186). The position as regards type specimens was dealt with in further detail by the Fourteenth International Congress of Zoology, Copenhagen, 1953 (1953, Copenhagen Decisions zool. Nomencl.: 72—78).

common practice of arguing disingeniously in support of desired objectives. Arkell's legal argumentation as distinct from his request that the *Règles* be suspended, to which it is irrelevant, seems to be an example of this practice.

Frizzell's objection is based on the fact that the resolution originally contained the word "holotype" where the more correct wording would have been "lectotype". Since the difference in wording does not affect the tenor of the resolution and constitutes only a technical correction, the word "lectotype" in the resolution submitted to the commission replaces the word "holotype" of the original draft.

Reeside's comment suggests that his vote was conditioned on his contention that the types of species are no concern of the Commission, a view that the Chairman feels would be difficult to support except on the negative grounds that the *Règles* as at present constituted fail to provide for the type of a species except in an inferential way in Appendix A. On the other hand several *Opinions* recognize their existence. Surely here is a point badly in need of explicit clarification.³

In view of the closeness of the vote on this resolution (with one member not voting) the Joint Committee does not feel justified in taking a stand. Nevertheless it passes on to the Commission the resolution and the record of the vote, with comments, for what it may be worth as a contribution to the Commission's study of the case.

10. Issue of Public Notices: On 29th September 1947 a notice of the possible use, by the International Commission on Zoological Nomenclature, of its Plenary Powers in the present case was issued to the serial publications prescribed by the Ninth International Congress of Zoology, Monaco, 1913. The publication of this notice elicited no objection to the action proposed.

III.—THE DECISION OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

11. The present application was considered by the International Commission on Zoological Nomenclature at the Thirteenth Meeting of its Paris Session held at the Sorbonne in the Amphithéâtre Louis-Liard on Monday, 26th July 1948 at 1730 hours. The following is an extract from the Official Record of the Proceedings of the International Commission setting out the decision reached by it in this case at the foregoing meeting (Paris

³ The defect in the *Règles* here referred to by Dr. Brookes Knight has since been rectified by the International Congress of Zoology. See Footnote 2.